

**Anisotropic magnetic properties of ErRu_2Si_2 as a consequence of the
local symmetry**

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ErRu_2Si_2 exhibits layered antiferromagnetic order below $T_N=6\text{K}$ and shows large magnetocrystalline anisotropy with the easy axis $[110]$. The magnetization at 7T, applied along this axis, reaches $8.58 \mu_B/\text{f.u.}$ whereas along the tetragonal axis only $0.5 \mu_B/\text{f.u.}$ Moreover, ErRu_2Si_2 exhibits the substantial in-plane anisotropy. We have attributed the magnetism of ErRu_2Si_2 to the Er ions. Performed calculations of the fine electronic structure of the Er^{3+} ions taking into account crystal-field (CEF) and inter-site spin-dependent exchange interactions reproduce well the zero-temperature moment, temperature dependence of the magnetic susceptibility, single-crystalline anisotropic magnetization curves and the overall specific heat with the sharp λ -type peak at T_N .

The obtained CEF interactions in ErRu_2Si_2 are in good agreement with those obtained for PrRu_2Si_2 indicating the single-ion origin of the giant anisotropic properties of this family of intermetallic compounds.